

991222



# PATENT SPECIFICATION

DRAWINGS ATTACHED

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## COMPLETE SPECIFICATION

### Improved Method and Apparatus for Setting Up and Sealing the Walls of Boxes

5 We, MARDON, SON AND HALL, LIMITED, a British Company of Caxton Works, Temple Gate, Bristol 1, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

10 This invention relates to setting up the walls of flat blanks in the formation of rectangular box bodies or lids, hereinafter referred to as boxes, and for sealing the walls together at the corners to provide a formed box.

15 The blanks concerned are of the kind comprising a central rectangular base panel a wall hinged to each edge thereof which walls, when the blank has been set up, are joined at the corners by a flap extending from the end of one wall that is turned at the corner to lie flat against the adjacent wall and is secured thereto by adhesive, or the joints at the corners may comprise diagonally scored panels that are bent up into triangular pleats and adhesively secured to one wall. Such blanks are hereinafter referred to as blanks of the kind described.

25 It is an object of the present invention to provide an improved method and apparatus for setting up flat blanks and sealing them at the corners that shall be speedy in action.

30 The present invention consists in apparatus for setting up flat blanks of the kind described and for sealing the corners together comprising means for delivering a blank of which the corner joints are precoated with adhesive from a pile, so that it comes to rest with its base panel opposite an aperture of corresponding shape, means for driving one of a series of continuously moving formers, also of similar shape, against the base panel, thereby forcing the blank through the aperture to set up the walls and corner joints, and then to pass said set up blank through a confining passage that

includes a radio-frequency field wherein the corner joints are pressed into intimate contact with their adjacent walls and simultaneously the adhesive is set, and means, operative at a later stage of movement of the former, to strip the formed box therefrom and pass it to a delivery destination.

50 Preferably the formers are mounted at spaced intervals on an endless conveyor, said conveyor having two parallel runs during the first of which the box is formed while during the second run, the formed box is stripped from the former.

55 Each former may comprise a tray whose up-standing walls correspond to the shape of the base panel, and means may be provided to deliver an article to be packed to the tray before said tray is forced through the aperture. A liner may be fed into the path of the tray after the article has been delivered thereto.

60 Embodiments of the present invention are illustrated in the accompanying drawings in which:—

65 Figs. 1 and 1A show an elevation of the machine.

Fig. 2 is a view on the line 2—2 of Fig. 1.

70 In Fig. 1, one of the channel shaped members 20 is omitted.

75 A hopper 1 for flat blanks 2 is vertically arranged above an endless horizontal conveyor 3, said conveyor including spaced pushers 4 adapted to feed a blank drawn downwardly into the path of said pushers by a reciprocable suction member 5.

80 The pushers 4 deliver the blanks 2 one by one along guide rails 6 arranged below the hopper 1 and below the lower stretch 7 of a second horizontally disposed conveyor 8. The conveyor 8 also includes pushers 9 that take over from the pushers 4 and feed the blank beneath a pair of upper curved guide rails 10 so that it finally reaches a stop 11 at

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the side of a pair of horizontal blank supporting arms 12.

Below the aforementioned guide rails 6 there is mounted on a fixed part of the machine a container 13 for adhesive. The container includes a gumming roller 14 that rotates in the gum and applies the latter to four pads 15, one for each corner flap of the blank (only two pads show in the drawing). The pads, as will be seen are mounted on a roller 16 that rotates in timed relation with the feed of the blanks and so applies gum to the corner flaps as the blank passes thereover.

The horizontal arms 12 include side cheeks —not illustrated—which together with the stop 11 act to position a blank correctly for entry into an aperture in a plate 30.

A short distance above the arms 12 there is secured to a bracket 17 the fixed plate 30 of substantial thickness that is apertured to correspond with the size of the base of the box.

A series of formers 18 are secured between a pair of vertically disposed endless chain conveyors 19 in such a manner that they continuously move upwardly in turn between the two arms 12. Lift a blank off said horizontal arms and drive it between the rails 10 and through the aperture in the plate 30, thereby setting up the walls of the box by bending them downwardly. The aperture is so shaped that, simultaneously with the bending down of the walls, it acts to bend in the corner flaps of the blank so that they lie flat against their adjacent walls.

In line with the aperture in the plate 30, and above said aperture, is a confining passage comprising a tube of rectangular cross-section constituted by two channel shaped members 20. Four positive electrodes 21 of a radio-frequency circuit are mounted in walls of the tube.

Two opposite walls of the former 18 are provided with plates 31 and these plates constitute negative electrodes of the R.F. circuit. The plates are electrically connected via the conveyors 19 to earth.

22 are guides that engage a set up box, which with the electrodes 21 act to confine the box and hold the corner joints in intimate contact with the adjacent walls. Thus it will be appreciated that as the former carries the set up box through the tube an R.F. field is operative through overlapping corner joints to set the adhesive and secure the box together.

The former then carries the set up box through 180° at the top of the conveyor and finally deposits it on a delivery conveyor 23 in its upright position.

On the downward run of the endless chain conveyor 19, a pair of conveyors 32 having corresponding spaced projections run downwardly on opposite sides of the box and they run at a faster rate than the chain conveyor 19, so that they act to strip each box off its former for deposit on the delivery conveyor.

If the box is, as shown in Fig. 1, of the kind that includes a lid hinged to one wall, then it may pass to mechanism for closing said lid.

The formers 18 may be shallow trays, whose external outline corresponds to the base of a box, and below the horizontal arms 12 there may be mounted an article delivery platform 24 to which articles to be packed are delivered in turn so that each former picks up an article before driving the blank through the aperture. The articles 28 are supported on spring pressed fingers 29 and as the formers 18 pass through the hollow platform 24, they brush the fingers aside to permit the article to be carried in the tray portion of the former.

A web of lining paper 26 may be drawn from a reel 27 and pass through a pair of cut-off knives 25 to deliver a sheet of lining paper to each article filled former before it reaches the aperture whereby as the box is formed, it is lined with paper.

All the parts of the mechanism run in synchronism so that the flat blanks are fed at regular intervals, are operated on at regular intervals and are deposited on the delivery conveyor at regular intervals.

The coating mechanism 13 to 16 may be dispensed with and the blanks coated with an adhesive that is dried before stacking them in the pile in the hopper 1. In that case the coating may be applied all over the blank and suitable adhesives for this purpose are polyethylene, polyvinylidenechloride and polyvinylchloride.

In a modified mechanism for applying adhesive to a blank while it is being fed to the aperture, two pairs of wicks are adapted to reciprocate up and down so that they apply a line of adhesive to the blank as it moves along.

In a further modification the relative timing between the first and second pusher conveyors delivering the blanks to the aperture may be such as to bring each blank momentarily to rest above a tank containing adhesive while a dabber oscillates up and down in said tank to apply patches of the adhesive to the blank.

#### WHAT WE CLAIM IS:—

1. Apparatus for setting up flat blanks of the kind described and for sealing the corners together comprising means for delivering a blank of which the corner joints are precoated with adhesive from a pile, so that it comes to rest with its base panel opposite an aperture of corresponding shape, means for driving one of a series of continuously moving formers, also of similar shape, against the base panel, thereby forcing the blank through the aperture to set up the walls and corner joints, and then to pass said set up blank through a confining passage that includes a radio-frequency field wherein the corner joints are pressed into intimate contact with their adjacent walls and simultaneously the adhesive is set, and means, operative at a later stage of movement of the

former, to strip the formed box therefrom and pass it to a delivery destination.

2. Apparatus as claimed in claim 1 in which the formers are mounted at spaced intervals on an endless conveyor, said conveyor having two parallel runs during the first of which the box is formed while during the second run, the formed box is stripped from the former.

3. Apparatus as claimed in claim 2 in which each former comprises a tray whose up-standing walls correspond to the shape of the base panel, and means are provided to deliver an article to be packed to the tray before said tray is forced through the aperture.

4. Apparatus as claimed in any one of the preceding claims in which a liner is fed into the path of the tray after the article has been delivered thereto.

5. Apparatus as claimed in any one of the preceding claims in which the blanks are pre-coated with an adhesive that is dried before stacking them into a pile. 20

6. Apparatus as claimed in any one of claims 1 to 4 in which means are provided to coat the blanks during their passage from the pile to the aperture. 25

7. The improved apparatus for setting up flat blanks and for sealing the corners together constructed and operating substantially as hereinbefore described with reference to the accompanying drawings. 30

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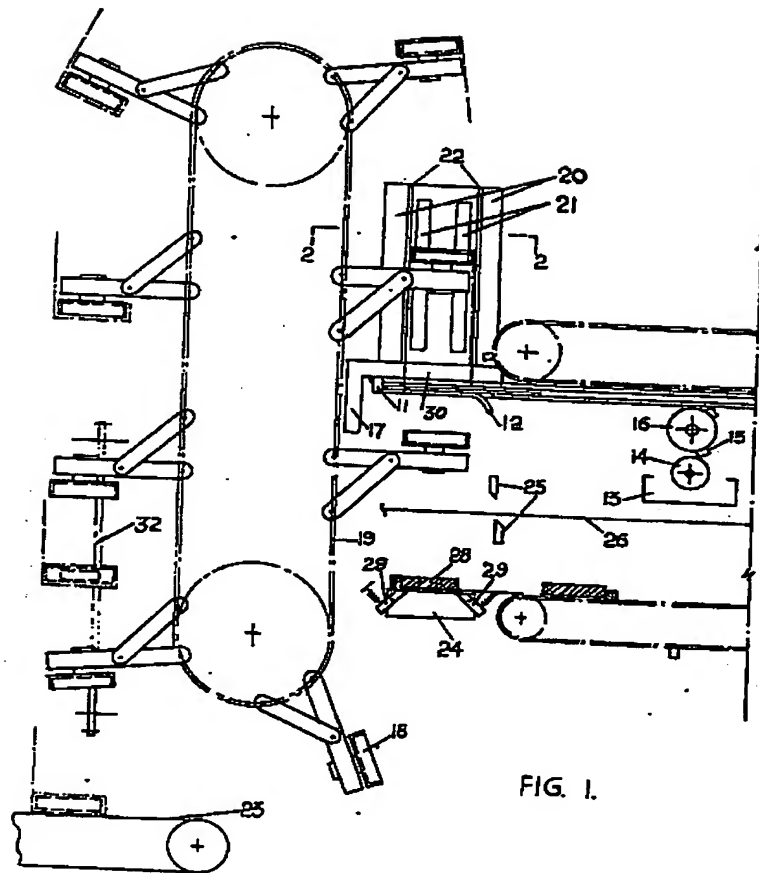
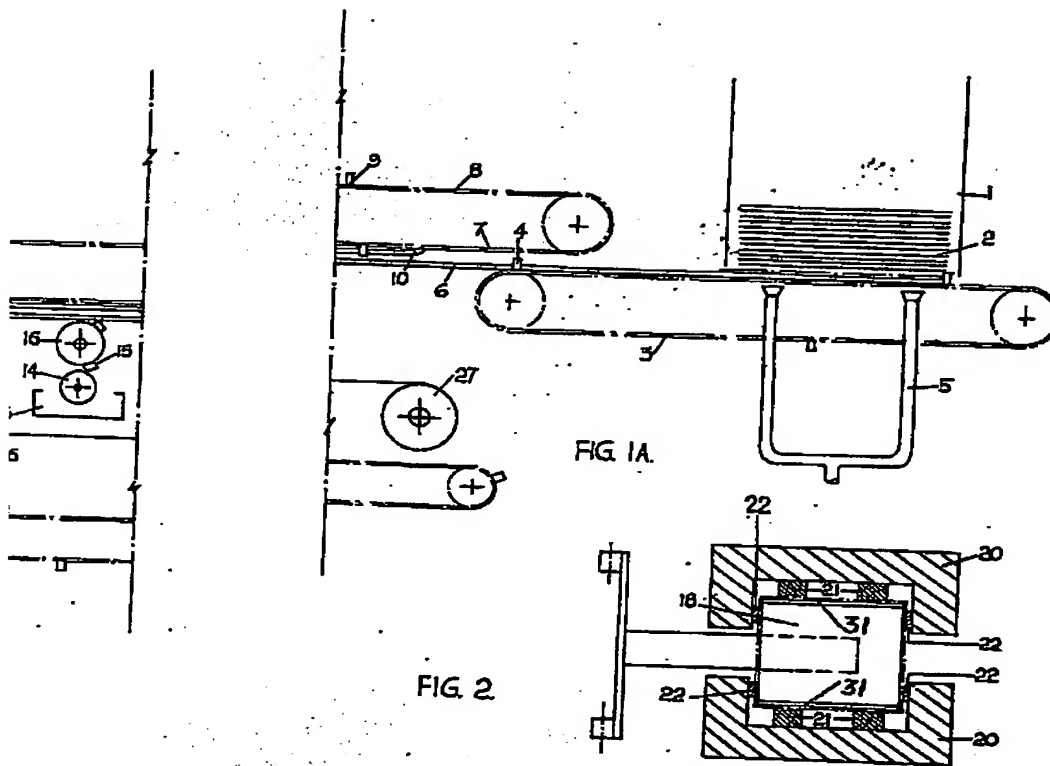


FIG. 1.

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 This drawing is a reproduction of  
 the Original on a reduced scale  
 Sheets 1 & 2

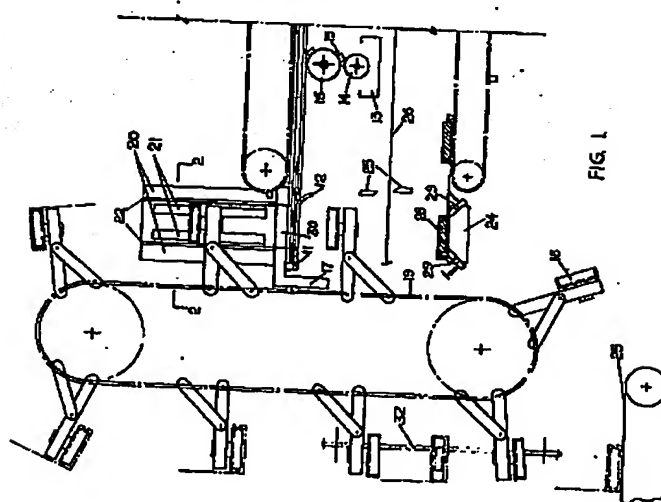


FIG. 1

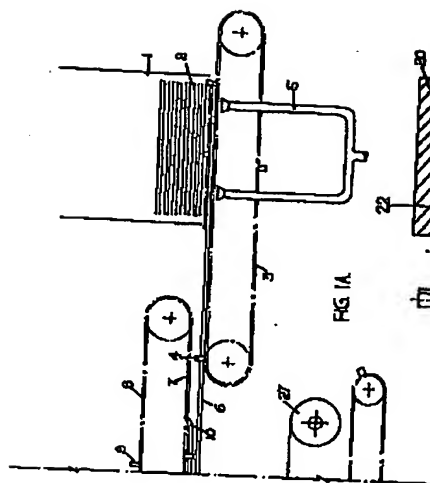


FIG. 1A

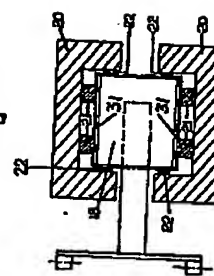


FIG. 2

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